## REFERENCE CHART

1. Can be used as a body stain at high temperatures.
1a. Use as a body stain only.
2. Maximum temperature - 2156° F.
3. Maximum temperature - 2300° F.
4. Maximum temperature - 1976° F.
5. Do not use zinc in glaze.
6. May be used with or without zinc.
7. Zinc not necessary, but gives better results.
8. Best results with no zinc.
9. Glaze must contain 12% to 15% calcium carbonate.

## ABOUT MASON STAINS

Mason Stains are oxides or a combination of oxides and opacifiers which have been blended and fritted to ensure color consistency and stability for uniformity of results in firing. They can be used to color clay bodies, slips, engobes, and glazes. The fired color of most stains is very similar to the raw color and they can be blended to achieve other colors.

The composition chart and reference chart, both listed on this page, provide valuable information when determining which stains will work best for the results you are trying to achieve. Each Mason Stain listed on the next two pages includes the codes that apply to that particular stain. The information on the reference chart is supplied by Mason and reflects their testing results.

The best results can be obtained when a stain is added to a white clay body, slip base, casting slip, or engobe. They can be used at all firing temperatures, but are formulated specifically for use in oxidizing atmospheres. Results in a reduction atmosphere may vary. Percentages of stain added should be determined by testing. The suggested percentage is 10% to 20%, and this will vary based on the color intensity desired. The percentage will also be different based on which stain you choose. For example, even if 10% of a particular blue stain provides a desired result, 15% of a yellow stain added to the base might be necessary. When adding stains to a moist or liquid base such as moist clay, glaze, or slip, try mixing the stain first with a little bit of water (to a consistency of latex paint or slightly thicker) to facilitate easier blending to the base. Heavy-duty (or freezer style) zip-close plastic baggies are particularly useful when adding stain to a clay body in small amounts to reduce mess and wasted stain. Just close the bag securely and knead the stain into the clay until well mixed. You can also make thin slabs of clay and apply a layer of the stain-and-water mixture between each slab, then knead/wedge together.

Mason Stains can be used to color either transparent or opaque base glazes and are generally added in amounts of 1% to 10%. When working with a glaze, be sure to check the reference number of the stain in regard to the content of calcium and zinc. The base glaze should have a calcium carbonate content of 12% to 15% and no zinc. Zinc can affect some colors such as chrome-tin pinks and chrome-calcium greens. However, cobalt- blue stains are compatible with zinc-bearing glazes. Stains used in transparent glazes create a translucent or semi-translucent appearance. An opacifier such as zircopax, superpax, or tin oxide can be used if an opaque color is desired (or start with a opaque glaze as a base). The stain and opacifier should equal 15% of the total glaze batch. Tin should be used as an opacifier only with chrome-tin pinks, vanadium yellows, and cobalt blues.

Mason Stains can be mixed with water and used as "watercolors" or to achieve a majolica appearance, when applied over a white (or any color you choose) glaze. For low-fire applications (cone 06-04), mix 1 part stain, 1 part gerstley borate (or a substitute like Laguna Borate), and 1 part frit 3124, then mix with water to desired consistency. As an alternative for people who don't want to use gerstley borate, use 1 part stain and 1 part frit 3124. For high-fire applications (cone 4 and higher), recipes vary with glaze formula and will require experimentation. Many potters will use the stain without any additional chemicals or melters, but it often depends on the base glaze.

## ANSWERS TO FREQUENTLY ASKED QUESTIONS ABOUT MASON STAINS

***Q.*** *Why do I not get good pinks or crimsons at Cone 06/2/5/10, etc.?*
**A.** Mason's chrome-tin pink series, #6000 to #6006, are stable from Cone 06 (normal "low" temperature) to Cone 12 (normal "high" temperature). This type of pigment requires the correct glaze chemistry in all temperature ranges, in order to maximize the "color value". High calcium content is most important, and zinc & magnesia must be low to zero. Boron should not be too high. A major complication is that these rules do not necessarily apply when "fast-firing" techniques are used. Second, these pigments need an oxidizing atmosphere throughout the firing cycle.

***Q.*** *When I use black stains to make gray shades they turn green/brown/blue/pink, etc. Why are they not simply gray?*
**A.** Do not use black stains to make gray shades by using small amounts in the glaze. Blacks are made of combinations of cobalt, iron, nickel, chromium, manganese, etc., and if low percentages are used the resulting color is often that of the predominant oxide in any particular black pigment. Again, care should be taken to use the correct glaze chemistry to avoid combinations that create color problems. It is better to use the gray pigments that we offer.

***Q.*** *Why does my green glaze turn brown or has brown edges?*
**A.** This is usually due to the presence of zinc. Remove any zinc from the formula, because it turns chromium brown in most situations. Additional calcium may help.

***Q.*** *Why does my glaze appear "milky"?*
**A.** Too much boron in the frit or glaze formula, under-firing, or the presence of opacifier in amounts greater than 2%.

***Q.*** *Why is my purple/lilac/violet glaze turning blue?*
**A.** Some of these pigments are made of chrome-tin pink and cobalt. (See Q. #1). Sufficient calcium is needed to support the "red" side of the mixture.

***Q.*** *How do I make a nice red-brown using your regular brown pigments?*
**A.** The base glaze should contain from 3-5% zinc. This supports the red side of the stain.

***Q.*** *My blue under-glaze runs, creating a "fuzzy" appearance. How can I prevent this?*
**A.** Cobalt silicate is very soluble in the glaze, so it is better to use cobalt aluminate, or a combination of both. Too high a temperature can also cause this effect.

***Q.*** *Can I mix pigments to make my own color palette?*
**A.** Yes, in most instances. However, some stains are incompatible with others, so if you do not achieve the result you want you should phone the Mason laboratory for further information.

***Q.*** *Do your pigments contain lead compounds?*
**A.** No. Lead compounds are not used in Mason pigments.

***Q.*** *What are "encapsulated" pigments? Are they safe to use?*
**A.** Encapsulation is a special, patented, manufacturing process designed to incorporate certain metallic oxides into the crystals of zirconium oxide. They are also referred to as "inclusion" pigments. They are safe to use, and are now widely used in ceramic manufacture around the world. Obviously, as with all finely dispersed powders, care should be taken to keep operations as dust-free as possible.

## COMPOSITION CHART

| | |
|---|---|
| Al | Aluminum oxide |
| B | Boric oxide |
| Ca | Calcium carbonate |
| Cd | Cadmium |
| Co | Cobalt oxide |
| Cr | Chromium oxide |
| Fe | Iron oxide |
| Mn | Manganese dioxide |
| Ni | Nickel oxide |
| Pr | Praseodymium oxide |
| Sb | Antimony oxide |
| Si | Silicon dioxide |
| Sn | Tin dioxide |
| Ti | Titanium oxide |
| V | Vanadium |
| Zn | Zinc oxide |
| Zr | Zirconium dioxide |

**Mason Stain color charts are available for $5.00 each (order code = MSCHART)**